

Nick Ryder

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Education

- 2014– **PhD in Mathematics**, *U.C. Berkeley*, Berkeley, California, *GPA - 4.00.*
5th Year Graduate Student
- 2010–2014 **Bachelor of Arts in Mathematics**, *Rice University*, Houston, Texas, *GPA - 4.05.*

Experience

Research Experience

- Summer 2017 **Computational Methods and Function Theory**, *Maria Curie-Skłodowska University.*
- Summer 2016 **Algebraic and Spectral Graph Theory Workshop**, *Banff International Research Station.*
- Fall 2014 **Algorithms and Complexity in Algebraic Geometry**, *Simons Institute.*
Participated in lecture series and research projects
- Summer 2013 **Cornell University Mathematics Research Experiences for Undergraduates.**
- Summer 2012 **Pennsylvania State University Mathematics Research Experiences for Undergraduates.**

Professional Experience

- Summer 2018 **Applied Scientist Intern**, *Amazon Web Services.*
Researched on two projects relating to random projections
- Summer 2015 **MATH 54 Instructor of Record**, *Berkeley.*
Organized and lectured for a summer session in introductory linear algebra
- 2014 – **Graduate Student Instructor**, *Berkeley.*
Led discussion sections for fifty undergraduates in introductory linear algebra and numerical analysis

Academic Service

- Spring 2013 **Geometry Tutor**, *Rice University.*
Tutored peers in upper level math course
- Summer 2011 **Algebra II Teacher**, *Collegiate Summer Academy*, Dallas, TX.
Taught under resourced high school students in the Dallas Area Algebra II

Honors and Awards

- 2014,2015,2016 **Honorable Mentions**, *NSF Graduate Fellowship Research Program.*
- 2013 **Hubert E. Bray Prize in Mathematics**, *Rice University.*
Awarded to the most outstanding junior mathematician at Rice University

2010 - 2014 **Trustee Distinguished Scholar**, *Rice University*.
Rice University's highest ranking academic scholarship

Publications

- Jonathan Leake and Nick Ryder, *Generalizations of the matching polynomial to the multivariate independence polynomial*, Algebraic Combinatorics, To Appear. <https://arxiv.org/abs/1610.00805>.
- Prasad Raghavendra, Nick Ryder, Nikhil Srivastava, Benjamin Weitz, *Exponential lower bounds on spectrahedral representations of hyperbolicity cones*, SODA 2019, To Appear. <https://arxiv.org/abs/1711.11497>.
- Prasad Raghavendra, Nick Ryder, and Nikhil Srivastava, *Real stability testing*, Innovations in Theoretical Computer Science, 8th Edition, Article 5, pp 1-15 (2016)
- Grey Ballard, Christian Ikenmeyer, JM Landsberg, and Nick Ryder, *The geometry of rank decompositions of matrix multiplication ii: 3×3 matrices*, Journal of Pure and Applied Algebra, To Appear. <https://arxiv.org/abs/1801.00843>.
- Nick Ryder and JM Landsberg, *On the geometry of border rank algorithms for $n \times 2$ by 2×2 matrices*, Experimental Mathematics.
- P. Li, N. Ryder, R. Strichartz, B. Ugurcan, *Extensions and their minimizations on the sierpinski gasket* Potential Analysis November 2014, Volume 41, Issue 4, pp 1167-1201

Submitted Publications

- Jonathan Leake and Nick Ryder, *Connecting the q -Multiplicative Convolution and the Finite Difference Convolution*, preprint (2017) <https://arxiv.org/abs/1712.02499>.

Invited Talks

Conferences and Workshops

- May 2018 **Expected Characteristic Polynomial Techniques and Applications**, *Quantitative Linear Algebra*, UCLA.
- March 2018 **Graphs Across Domains Workshop**, *Berkeley Institute for Data Science*.
- January 2017 **Innovations in Theoretical Computer Science Conference 2017**, *Simons Institute, Berkeley*.
- January 2014 **Special Session on Fractal Geometry**, *AMS/MAA Joint Meeting*.

Seminars

- Fall 2017 **Exponential Lower Bounds on Spectrahedral Representations of Hyperbolicity Cones**, *Simon's Institute Hyperbolic Reading Group*.
- Fall 2017 **An Elementary Proof of Hermitian Helton-Vinnikov using Spectral Factorization**, *Student Discrete Analysis Seminar*.
- Spring 2017 **Bivariate Real Stability Testing**, *Applied Algebra Seminar*.
- Fall 2015 **Interlacing Families, Restricted Invertibility**, *The Geometry of Polynomials in Algorithms, Combinatorics, and Probability*.
- Fall 2014 **The Geometry of Minimal Decompositions of Matrix Multiplication Tensors**, *Seminar in Computational Algebraic Geometry*.